CURRENT LITERATURE

NOTES FOR STUDENTS

Conditions affecting flower development.—KLEBS[1] divides the process of flower formation by the rosettes of *Sempervivum Funkii* and *S. albidum* into 3 distinct, successive steps: (1) production of the condition of ripeness to flower (blühreife Zustand), (2) formation of flower primordia, and (3) development of flower clusters and elongation of the axis. Light is the dominant factor in determining all 3 of these stages of development.

In the first and third, light is effective entirely through its photosynthetic action, and its effectiveness rises with its energy value. Higher temperatures counteract light by favoring dissimilation. Accordingly, the effect of temperatures can in part be annulled by increased light intensities. It is the balance of assimilation over dissimilation that furthers the development of these 2 stages. KLEBS finds that at lower temperatures (about 6°C.) both these stages can be attained in darkness, although in the last it gives a far less extensive inflorescence. He thinks this is likewise tied up with a balance in favor of available carbon synthate. The low temperature gives low respiration and leads to the accumulation of soluble sugars by the hydrolysis of insoluble carbohydrates.

In the second step, formation of flower primordia, light has 2 distinct and antagonistic effects. The one which favors the process is due to the photosynthetic activity of the light and is a function of the less refrangible rays of the spectrum. The other, which inhibits the process or even annuls the ripe to flower condition, must at present be termed a stimulus effect, and it is a function of the less refrangible blue rays. Diffuse daylight is relatively injurious to primordia development because of the high percentage of blue violet rays it contains. The Osram light and direct sunlight favor this development because of the dominance of the red rays.

KLEBS says it is still an unanswered question whether inflorescence development in other forms and in plants in general can be divided into these 3 distinct steps with similar light effects in each step. He suggests some facts as evidence that such may be the case. His past work has done much to show that the formative effects of conditions on plants is largely through the nutrient effects of these conditions. Thus the formative effect of light is explained in a large part by its effect on carbon assimilation, but KLEBS points out here, as in his

[1] KLEBS, GEORGE, Über die Blütenbildung von *Sempervivum*. Festschrift zum ERNST STAHL. pp. 128–151. Jena. 1918.

older work, that there is also a specific formative action of the blue rays as yet unexplainable on the nutrient basis.

He has often distinguished between the amount of carbon synthate and the amount of salt nutrients as formative factors in the plant, especially in connection with reproduction; and now FISCHER[2] makes this more definite by considering the nitrogen supply as the most important formative factor furnished by the salts, and by speaking of the carbon nitrogen ratio (C/N) of plants. He probably would not deny that the supply of other nutrient elements, phosphorus, calcium, potassium, etc., have at least minor formative effects and often of an opposite nature from nitrogen. This ratio can be increased by increasing the photosynthesis of the plants or by decreasing the nitrogen supply. The ratio can be decreased by decreasing photosynthesis or by increasing the nitrogen supply. FISCHER comes to this important conclusion. Very high C/N in plants favors flowering, while a low C/N favors vegetation. His conclusions are largely based on his own work on the effect of increased partial pressure of carbon dioxide upon the development of plants, but not upon chemical analysis of the tissues.

KRAUS and KRAYBILL[3] have recently worked upon the tomato, varying the C/N in it by varying its nitrogen supply. On the basis of extensive cultures and chemical, microchemical, and anatomical studies, they come to the following conclusions: (1) a very high C/N gives little vegetative growth and poor reproduction with a high percentage of dry matter; (2) medium C/N gives moderate vegetation growth, good reproduction, and a medium percentage of dry matter; (3) very low C/N gives very vigorous vegetative growth, little reproduction, and a low percentage of dry matter. KRAUS's extensive horticultural investigations enable him to give much evidence that the C/N ratio is a factor of great significance in determining fruitfulness in many economic plants. The contribution apparently puts into the hands of producers one of the important means of controlling fruitfulness. FISCHER'S less extensive and one-sided attack caused him to miss the fact that a very high C/N not only reduces vegetative growth but diminishes reproduction.

These papers have thrown much light on some of the nutrient factors modifying vegetation and reproduction in plants.—WM. CROCKER.

Loss of chlorophyll.—MEYER[4] notes that in *Tropaeolum majus*, growing in pots in a greenhouse, the young leaves at the top of the stem are dark green, while the progressively older ones down the stem are green, bright green, yellow

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[2] FISCHER, H., Zur Frage der Kohlensaure-Einahrung der Pflanzen. Gartenflora **65**: 232–237. 1916.

[3] KRAUS, E. J., and KRAYBILL H. R., Vegetation and reproduction with special reference to the tomato. Oreg. Agric. Exper. Sta. Bull. 149. pp. 90. 1918.

[4] MEYER, ARTHUR, Eiweiszstoffwechsel und Vergilben der Laubblätter von *Tropaeolum majus*. Festschrift zum ERNST STAHL. pp. 85–127. Jena. 1918.